

## **Vermont Mental Health Performance Indicator Project**

DDMHS, Weeks Building, 103 South Main Street, Waterbury, VT 05671-1601 (802-241-2638)

### MEMORANDUM

TO: Vermont Mental Health Performance Indicator Project  
Advisory Group and Interested Parties

FROM: John Pandiani  
Monica Simon

DATE: January 11, 2002

RE: Mortality and Cause of Death for CRT clients

In response to earlier reports on mortality rates for recipients of mental health services ([www.state.vt.us/dmh/Data/PIPs/2001/pip082401.pdf](http://www.state.vt.us/dmh/Data/PIPs/2001/pip082401.pdf) and [www.state.vt.us/dmh/Data/PIPs/2000/pip121500.pdf](http://www.state.vt.us/dmh/Data/PIPs/2000/pip121500.pdf)) Bill McMains (DDMHS Medical Director) observed that the causes of death among seriously mentally ill individuals tend to be complications of obesity, smoking, hypertension, cardiovascular disease, and diabetes, and asked for analyses that include the cause of death. The attached pages present the results of analyses that compare the relative risk of death of CRT clients (compared to members of the general population) for two broad causes of death categories. One category, the category we are thinking of as "lifestyle" related, includes heart disease and lung cancer. The other category includes all other causes of death.

The data used in this analysis were drawn from two sources. The Vital Records Mortality Database, maintained by Vermont Department of Health, provided information on all Vermont residents who died during the study period. The Monthly Service Report database, maintained by DDMHS, provided information on all recipients of CRT services during the study period. The analysis involved measuring the overlap between two data sets (the number of individuals who appear in both data sets). Because these data sets do not share unique person identifiers, Probabilistic Population Estimation was used to determine the number of people receiving CRT services who died during the treatment year or the following year. In order to account for year-to-year variation in mortality rates, two-year mortality rates were calculated for all clients served in each of six base years. In order to account for variation in mortality rates among people in different age and gender categories, mortality rates were determined for each of eight age/gender categories. For purposes of comparison, the elevated risk of mortality for CRT clients was determined by dividing the mortality rate of service recipients by the mortality rate for the general population. Tables 2 and 3 report mortality rates for age, gender, and cause of death categories. Table 1 reports elevated risk of mortality for CRT service recipients for the eight age and gender categories.

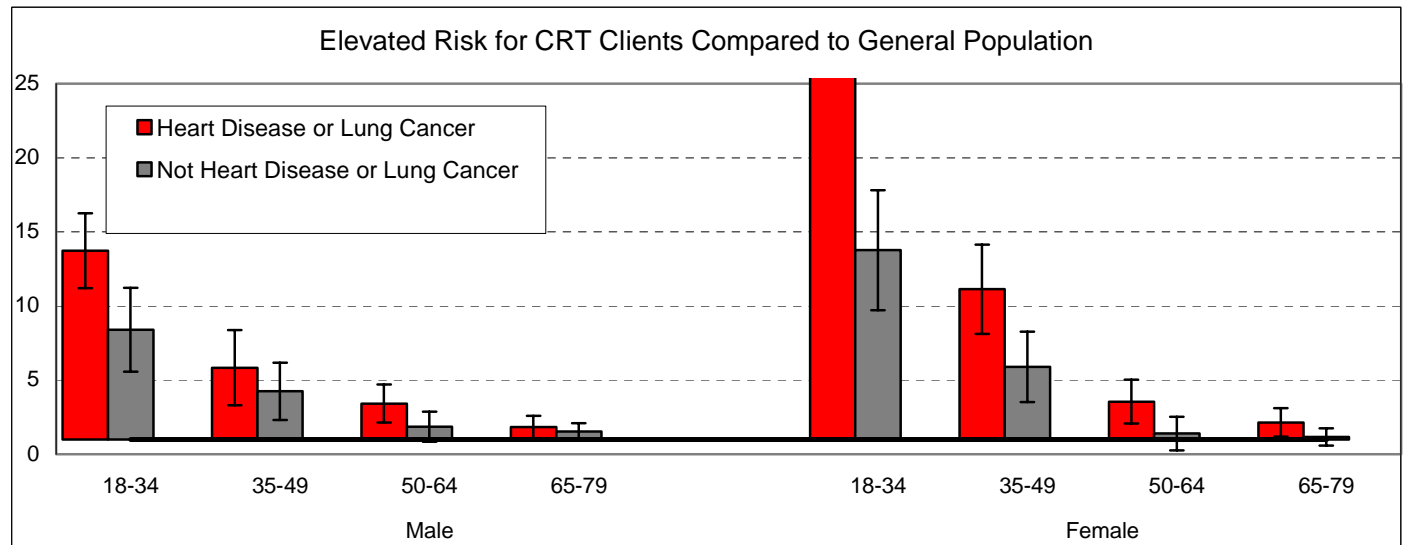
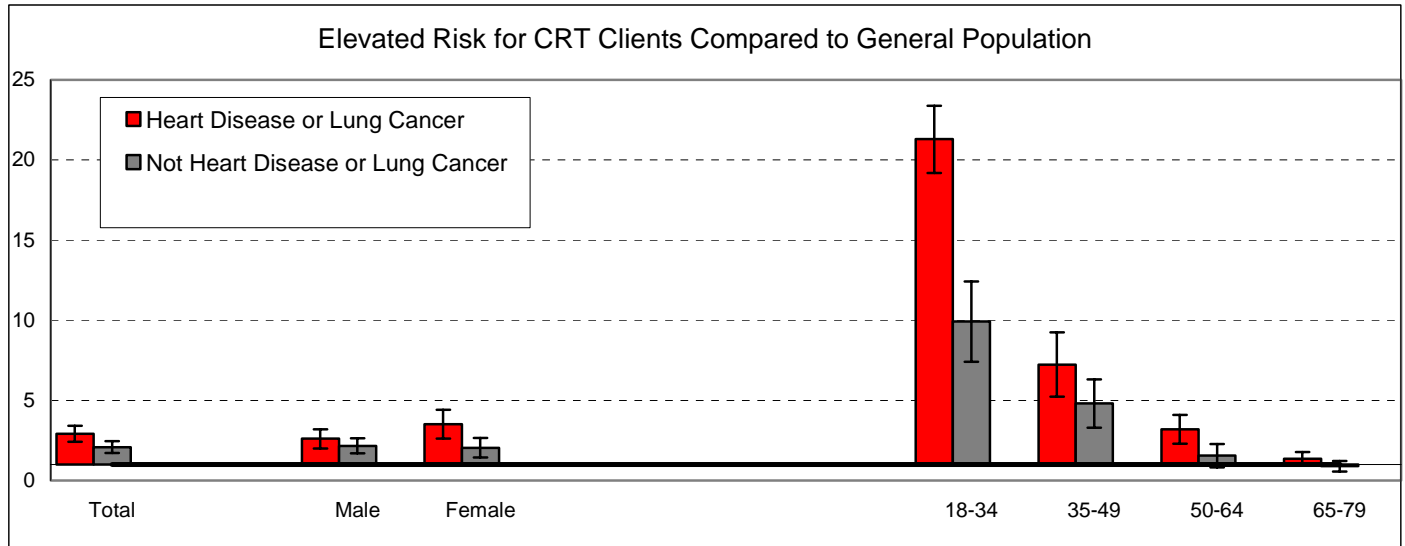
To the degree that CRT mortality rates for "lifestyle" related causes of death are more greatly elevated than mortality rates for other causes of death, the overall elevation of mortality rates for people with mental illnesses could be attributed to lifestyle factors, rather than other factors.

As you will see, the elevation of risk of mortality from heart disease and lung cancer is significantly greater than the elevation of risk of mortality from other causes for CRT clients overall, and for each of our three age groups under 65 (the elevated risks for the 65-79 age group are only marginally significant). Risk of mortality from heart disease and lung cancer is significantly greater than the elevation of risk from other causes for women, but not for men.

When age and gender are considered together, it is clear that the difference in elevated risk for our two cause of death categories is greatest in the 18-34 age group, and that the difference is much greater for women than for men. In the 35-49 age group, the difference between the two causes of death is substantial and significant for women but is not significant for men. In the 50-64 age group, risk of death from heart disease and lung cancer is similarly elevated for both men and women. Risk of death from other causes for the 50-64 age group, however, is not elevated compared to the general population. In the 65-79 age group, risk of death for CRT clients for both causes is similar to the risk of death for the population as a whole.

These findings could (and should) be considered from a number of different perspectives. We will be very interested in learning what you feel are important patterns in the attached tables, and how you interpret these patterns. Please send your observations and explanations to [jpandiani@ddmhs.state.vt.us](mailto:jpandiani@ddmhs.state.vt.us) or call 802-241-2638.

**Table 1**  
**Elevated Risk of Mortality**  
**Average Annual Rate of Mortality of CRT Clients**  
**During the Year of Treatment or the Subsequent Year: 1992 - 1997**



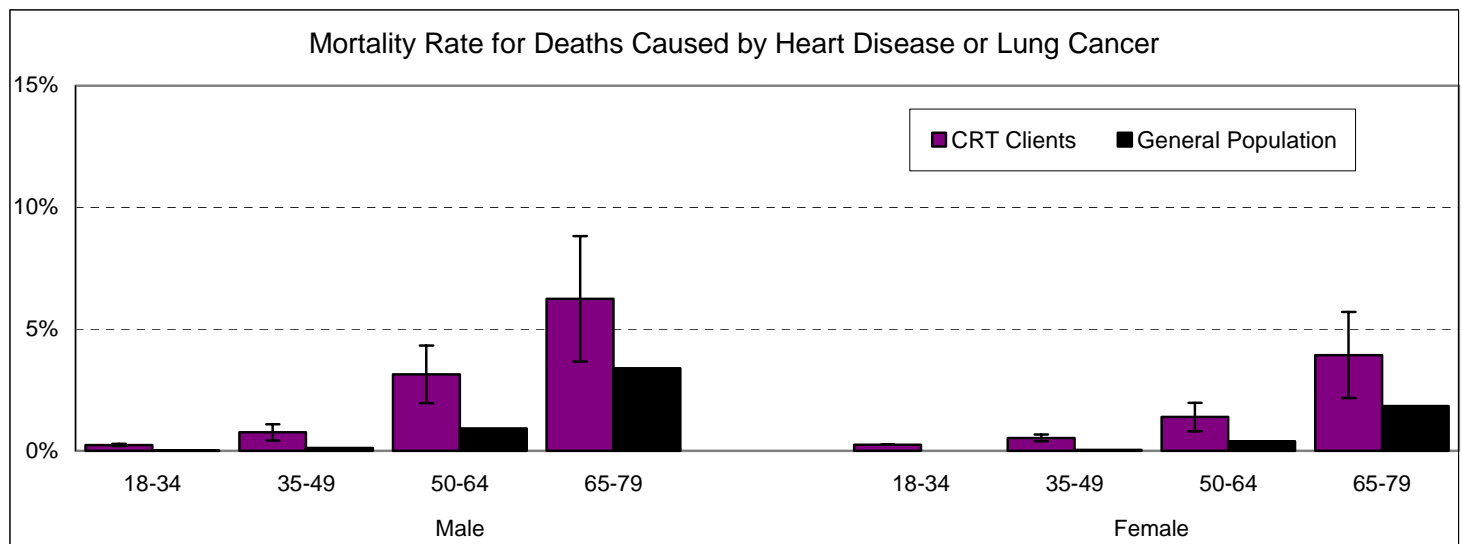
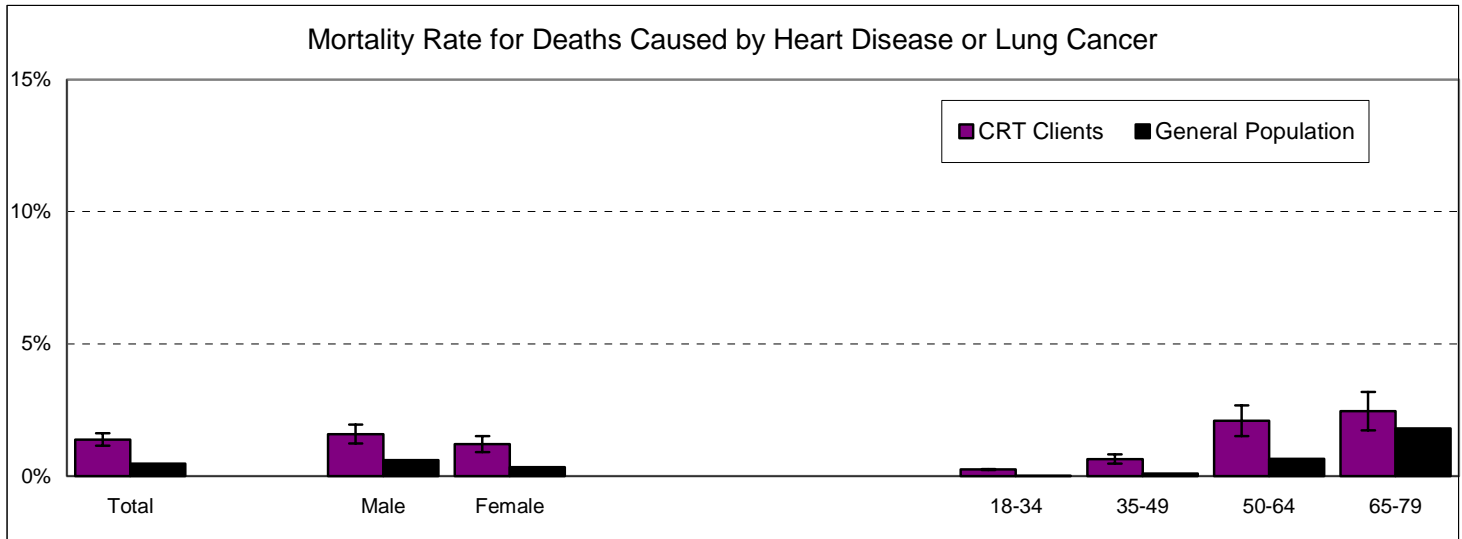
| Elevated Risk                    | Total     | Male      | Female    | 18 - 34    | 35 - 49   | 50 - 64   | 65 - 79   |
|----------------------------------|-----------|-----------|-----------|------------|-----------|-----------|-----------|
| Heart Disease or Lung Cancer     | 2.9 ± 0.5 | 2.6 ± 0.6 | 3.5 ± 0.9 | 21.3 ± 2.1 | 7.2 ± 2.0 | 3.2 ± 0.9 | 1.4 ± 0.4 |
| Not Heart Disease or Lung Cancer | 2.1 ± 0.4 | 2.2 ± 0.5 | 2.1 ± 0.6 | 9.9 ± 2.5  | 4.8 ± 1.5 | 1.6 ± 0.7 | 0.9 ± 0.3 |

| Elevated Risk                    | Male       |           |           |           | Female     |            |           |           |
|----------------------------------|------------|-----------|-----------|-----------|------------|------------|-----------|-----------|
|                                  | 18 - 34    | 35 - 49   | 50 - 64   | 65 - 79   | 18 - 34    | 35 - 49    | 50 - 64   | 65 - 79   |
| Heart Disease or Lung Cancer     | 13.7 ± 2.5 | 5.8 ± 2.5 | 3.4 ± 1.3 | 1.8 ± 0.8 | 45.6 ± 0.4 | 11.1 ± 3.0 | 3.5 ± 1.5 | 2.1 ± 1.0 |
| Not Heart Disease or Lung Cancer | 8.4 ± 2.8  | 4.2 ± 1.9 | 1.9 ± 1.0 | 1.5 ± 0.6 | 13.8 ± 4.0 | 5.9 ± 2.4  | 1.4 ± 1.1 | 1.2 ± 0.6 |

Based on analysis of Monthly Service Reports submitted to DDMHS by designated agencies and the Vital Records database maintained by the Vermont Health Department. Because these databases do not share unique client identifiers, Probabilistic Population Estimation was used to calculate the number of clients who died in the year of treatment or the subsequent year (with 95% confidence intervals).

Deaths attributed to cancer or heart disease use ICD-9 underlying cause of death codes 162, 390-398, 402, 404, and 410-429. Deaths not attributed to cancer or heart

**Table 2**  
**Heart Disease or Lung Cancer**  
**Average Annual Rate of Mortality of CRT Clients**  
**During the Year of Treatment or the Subsequent Year: 1992 - 1997**

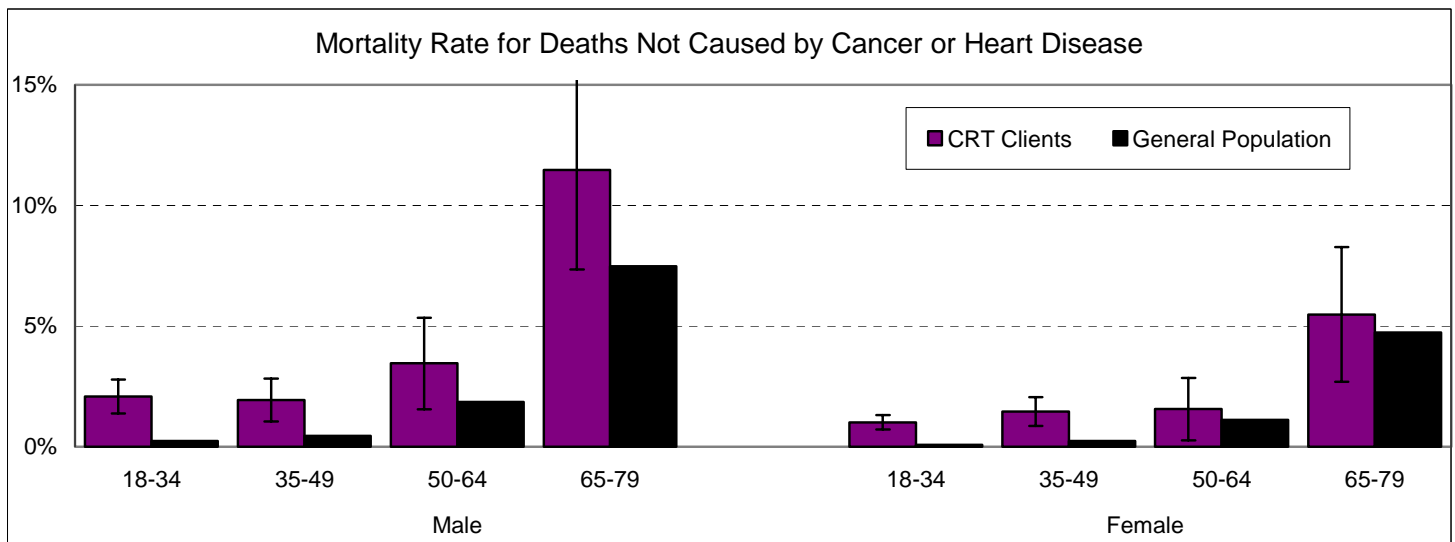
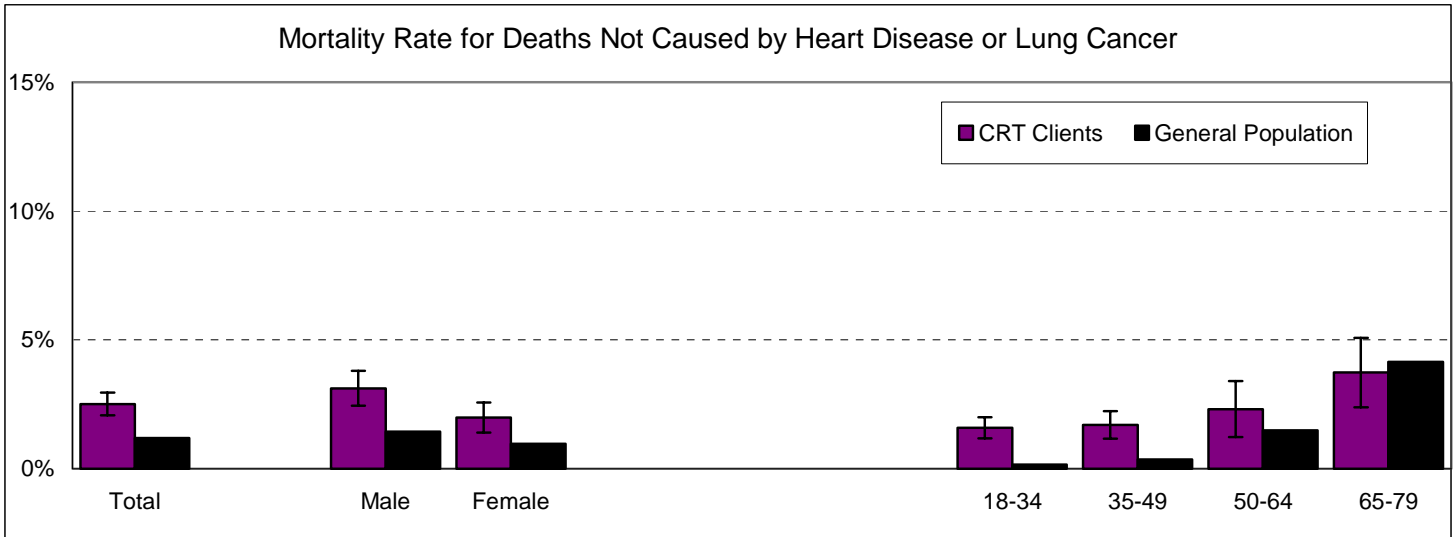


|                    | Total     | Male      | Female    | 18 - 34     | 35 - 49   | 50 - 64   | 65 - 79   |
|--------------------|-----------|-----------|-----------|-------------|-----------|-----------|-----------|
| CRT Clients        | 1% ± 0.2% | 2% ± 0.4% | 1% ± 0.3% | 0.3% ± 0.0% | 1% ± 0.2% | 2% ± 0.6% | 2% ± 0.7% |
| General Population | 0.5%      | 0.6%      | 0.3%      | 0.01%       | 0.1%      | 0.7%      | 1.8%      |
| Elevated Risk      | 2.9 ± 0.5 | 2.6 ± 0.6 | 3.5 ± 0.9 | 21.3 ± 2.1  | 7.2 ± 2.0 | 3.2 ± 0.9 | 1.4 ± 0.4 |

|                    | Male        |           |           |           | Female      |            |           |           |
|--------------------|-------------|-----------|-----------|-----------|-------------|------------|-----------|-----------|
|                    | 18 - 34     | 35 - 49   | 50 - 64   | 65 - 79   | 18 - 34     | 35 - 49    | 50 - 64   | 65 - 79   |
| CRT Clients        | 0.2% ± 0.0% | 1% ± 0.3% | 3% ± 1.2% | 6% ± 2.6% | 0.3% ± 0.0% | 1% ± 0.1%  | 1% ± 0.6% | 4% ± 1.8% |
| General Population | 0.02%       | 0.1%      | 0.9%      | 3.4%      | 0.01%       | 0.0%       | 0.4%      | 1.8%      |
| Elevated Risk      | 13.7 ± 2.5  | 5.8 ± 2.5 | 3.4 ± 1.3 | 1.8 ± 0.8 | 45.6 ± 0.4  | 11.1 ± 3.0 | 3.5 ± 1.5 | 2.1 ± 1.0 |

Based on analysis of Monthly Service Reports submitted to DDMHS by designated agencies and the Vital Records database maintained by the Vermont Health Department. Because these databases do not share unique client identifiers, Probabilistic Population Estimation was used to calculate the number of clients who died in the year of treatment or the subsequent year (with 95% confidence intervals).  
 Analysis includes ICD-9 underlying cause of death codes: 162, 390-398, 402, 404, and 410-429.

**Table 3**  
**Not Heart Disease or Lung Cancer**  
**Average Annual Rate of Mortality of CRT Clients**  
**During the Year of Treatment or the Subsequent Year: 1992 - 1997**



|                    | Total     | Male      | Female    | 18 - 34   | 35 - 49   | 50 - 64   | 65 - 79   |
|--------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| CRT Clients        | 3% ± 0.4% | 3% ± 0.7% | 2% ± 0.6% | 2% ± 0.4% | 2% ± 0.5% | 2% ± 1.1% | 4% ± 1.4% |
| General Population | 1.2%      | 1.4%      | 1.0%      | 0.2%      | 0.4%      | 1.5%      | 4.2%      |
| Elevated Risk      | 2.1 ± 0.4 | 2.2 ± 0.5 | 2.1 ± 0.6 | 9.9 ± 2.5 | 4.8 ± 1.5 | 1.6 ± 0.7 | 0.9 ± 0.3 |

|                    | Male      |           |           |            | Female     |           |           |           |
|--------------------|-----------|-----------|-----------|------------|------------|-----------|-----------|-----------|
|                    | 18 - 34   | 35 - 49   | 50 - 64   | 65 - 79    | 18 - 34    | 35 - 49   | 50 - 64   | 65 - 79   |
| CRT Clients        | 2% ± 0.7% | 2% ± 0.9% | 3% ± 1.9% | 11% ± 4.1% | 1% ± 0.3%  | 1% ± 0.6% | 2% ± 1.3% | 5% ± 2.8% |
| General Population | 0.2%      | 0.5%      | 1.9%      | 7.5%       | 0.1%       | 0.2%      | 1.1%      | 4.7%      |
| Elevated Risk      | 8.4 ± 2.8 | 4.2 ± 1.9 | 1.9 ± 1.0 | 1.5 ± 0.6  | 13.8 ± 4.0 | 5.9 ± 2.4 | 1.4 ± 1.1 | 1.2 ± 0.6 |

Based on analysis of Monthly Service Reports submitted to DDMHS by designated agencies and the Vital Records database maintained by the Vermont Health Department. Because these databases do not share unique client identifiers, Probabilistic Population Estimation was used to calculate the number of clients who died in the year of treatment or the subsequent year (with 95% confidence intervals).  
 Analysis includes all ICD-9 underlying cause of death codes except: 162, 390-398, 402, 404, and 410-429.